ELSEVIER

Aquaculture 177 (1999) vi–viii

Aquaculture

Contents

Editorial 1

Reproduction

Puberty in male fish: concepts and recent developments with special reference to the African catfish (*Clarias gariepinus*)
R.W. Schulz and H.J.Th. Goos (Utrecht, Netherlands) 5

Brain aminergic systems in salmonids and other teleosts in relation to steroid feedback and gonadotropin release
C. Saligaut, B. Linard, B. Breton, I. Anglade, T. Bailhache, O. Kah and P. Jego (Rennes, France) 13

Effects of sustained administration of testosterone in pre-pubertal sea bass (*Dicentrarchus labrax* L)
S. Zanuy, M. Carrillo, J. Mateos (Castellón, Spain), V. Trudeau (Ottawa, Ont., Canada) and O. Kah (Rennes, France) 21

The concentrations of plasma sex steroids and gonadal aromatase during controlled sex differentiation in grey mullet, *Mugil cephalus*
C.-F. Chang, C.-Y. Hung, M.-C. Chiang and S.-C. Lan (Keelung, Taiwan) 37

Mechanisms underlying photoperiodic effects on age at sexual maturity in Atlantic salmon, *Salmo salar*
G.L. Taranger (Matredal, Bergen, Norway), C. Haux (Göteborg, Sweden), T. Hansen (Matredal, Norway), S.O. Stefansson (Matredal, Bergen, Norway), B.T. Björnsson (Göteborg, Sweden), B.Th. Walther and H. Kryvi (Bergen, Norway) 47

Post-smolt growth and maturation of out-of-season 0 + Atlantic salmon (*Salmo salar*) reared under different photoperiods
N. Duncan (Stirling, UK), D. Mitchell (Fort William, UK) and N. Bromage (Stirling, UK) 61

Opposite effects of insulin-like gr. wth factors (IGFs) on gonadotropin (GtH-II) and growth hormone (GH) production by primary culture of European eel (*Anguilla anguilla*) pituitary cells
Y.-S. Huang, K. Rousseau, N. Le Belle, B. Vidal, E. Burzawa-Gérard, J. Marchelidon and S. Dufour (Paris, France) 73

Development of broodstock diets for the European Sea Bass (*Dicentrarchus labrax*) with special emphasis on the importance of $n-3$ and $n-6$ highly unsaturated fatty acid to reproductive performance
M. Bruce (Stirling, UK), F. Oyen (Madrid, Spain), G. Bell (Stirling, UK), J.F. Asturiano (Madrid, Spain), B. Farndale (Stirling, UK), M. Carrillo, S. Zanuy, J. Ramos (Madrid, Spain) and N. Bromage (Stirling, UK) 85

Growth & Development

Muscle development and growth: potential implications for flesh quality in fish
I.A. Johnston (St. Andrews, UK) 99

ELSEVIER

Aquaculture 177 (1999) vi–viii

Aquaculture

Contents

Editorial 1

Reproduction

Puberty in male fish: concepts and recent developments with special reference to the African catfish (*Clarias gariepinus*)
R.W. Schulz and H.J.Th. Goos (Utrecht, Netherlands) 5

Brain aminergic systems in salmonids and other teleosts in relation to steroid feedback and gonadotropin release
C. Saligaut, B. Linard, B. Breton, I. Anglade, T. Bailhache, O. Kah and P. Jego (Rennes, France) 13

Effects of sustained administration of testosterone in pre-pubertal sea bass (*Dicentrarchus labrax* L)
S. Zanuy, M. Carrillo, J. Mateos (Castellón, Spain), V. Trudeau (Ottawa, Ont., Canada) and O. Kah (Rennes, France) 21

The concentrations of plasma sex steroids and gonadal aromatase during controlled sex differentiation in grey mullet, *Mugil cephalus*
C.-F. Chang, C.-Y. Hung, M.-C. Chiang and S.-C. Lan (Keelung, Taiwan) 37

Mechanisms underlying photoperiodic effects on age at sexual maturity in Atlantic salmon, *Salmo salar*
G.L. Taranger (Matredal, Bergen, Norway), C. Haux (Göteborg, Sweden), T. Hansen (Matredal, Norway), S.O. Stefansson (Matredal, Bergen, Norway), B.T. Björnsson (Göteborg, Sweden), B.Th. Walther and H. Kryvi (Bergen, Norway) 47

Post-smolt growth and maturation of out-of-season 0 + Atlantic salmon (*Salmo salar*) reared under different photoperiods
N. Duncan (Stirling, UK), D. Mitchell (Fort William, UK) and N. Bromage (Stirling, UK) 61

Opposite effects of insulin-like gr. wth factors (IGFs) on gonadotropin (GtH-II) and growth hormone (GH) production by primary culture of European eel (*Anguilla anguilla*) pituitary cells
Y.-S. Huang, K. Rousseau, N. Le Belle, B. Vidal, E. Burzawa-Gérard, J. Marchelidon and S. Dufour (Paris, France) 73

Development of broodstock diets for the European Sea Bass (*Dicentrarchus labrax*) with special emphasis on the importance of $n-3$ and $n-6$ highly unsaturated fatty acid to reproductive performance
M. Bruce (Stirling, UK), F. Oyen (Madrid, Spain), G. Bell (Stirling, UK), J.F. Asturiano (Madrid, Spain), B. Farndale (Stirling, UK), M. Carrillo, S. Zanuy, J. Ramos (Madrid, Spain) and N. Bromage (Stirling, UK) 85

Growth & Development

Muscle development and growth: potential implications for flesh quality in fish
I.A. Johnston (St. Andrews, UK) 99

Growth hormone axis as marker of nutritional status and growth performance in fish
J. Pérez-Sánchez (Castellón, Spain) and P.-Y. Le Bail (Rennes, France) 117
Does light have an influence on fish growth?
G. Boeuf and P.-Y. Le Bail (Plouzané, France) 129
In vitro characterization and in vivo clearance of recombinant barramundi (*Lates calcarifer*) IGF-I
B.G. Degger (Adelaide, SA, Brisbane, QLD, Australia), N. Richardson, C. Collet (Brisbane, QLD, Australia), F.J. Ballard and Z. Upton (Adelaide, SA, Australia) 153
Regulation of nutrient intake and energy balance in salmon
J.T. Silverstein, K.D. Shearer, W.W. Dickhoff and E.M. Plisetskaya (Seattle, WA, USA) . . . 161
Larviculture of marine fish: problems and perspectives
M. Planas and I. Cunha (Vigo, Spain) 171

Nutrition & Metabolism

Recent developments in the essential fatty acid nutrition of fish
J. Sargent, G. Bell, L. McEvoy, D. Tocher and A. Estevez (Stirling, UK) 191
Fish larval nutrition: a review of recent advances in the roles of amino acids
I. Rønnestad, A. Thorsen and R.N. Finn (Bergen, Norway) 201
Collaborative opportunities between fish nutrition and other disciplines in aquaculture: an overview
R.W. Hardy (Hagerman, ID, USA) 217
Gastrointestinal delivery of peptide and protein drugs to aquacultured teleosts
E. McLean, B. Rønsholdt, C. Sten (Aalborg, Denmark) and Najamuddin (Ujung Pandang, Indonesia) 231
A highly efficient microencapsulated food for rearing early larvae of marine fish
M. Yúfera, E. Pascual and C. Fernández-Díaz (Cádiz, Spain) 249
The effect of diet and short duration hyperoxia exposure on seawater transfer in coho salmon smolts (*Oncorhynchus kisutch*)
C.J. Brauner (Vancouver, BC, Canada) 257
Metabolism of trout red blood cells: correlation between cation transport and oxygen uptake following adrenergic stimulation
T. Wang (Odense, Denmark), A.R. Cossins (Liverpool, UK) and O.B. Nielsen (Århus, Denmark) 267
Gill lipid metabolism and unidirectional Na^+ flux in the European eel (*Anguilla anguilla*) after transfer to dilute media: the formation of wax alcohols as a primary response
H.J.M. Hansen, M.H. Grosell (Roskilde, Denmark) and P. Rosenkilde (Copenhagen, Denmark) 277
The acute humoral adrenergic stress response in fish: facts and fiction
S.F. Perry and N.J. Bernier (Ottawa, Ont., Canada) 285
Ambient salinity modulates the response of the tilapia, *Oreochromis mossambicus* (Peters), to net confinement
D.T. Nolan, R.L.J.M. Op't Veld, P.H.M. Balm and S.E. Wendelaar Bonga (Nijmegen, Netherlands) 297

Pathology & Toxicology

The use of monoclonal antibody probes in salmonid cryptobiosis
P.T.K. Woo (Guelph, Ont., Canada) 311
Whole clam culture as a quantitative diagnostic procedure of *Perkinsus atlanticus* (Apicomplexa, Perkinsea) in clams *Ruditapes decussatus*
M. Almeida (La Tremblade, France; Faro, Portugal), F. Berthe, A. Thébault (La Tremblade, France) and M.T. Dinis (Faro, Portugal) 325
Techniques for microbial control in the intensive rearing of marine larvae
J. Skjermo and O. Vadstein (Trondheim, Norway) 333

Vitellogenesis as a biomarker of reproductive disruption by xenobiotics
D.E. Kime, J.P. Nash (Sheffield, UK) and A.P. Scott (Lowestoft, UK) 345
Trout oestrogen receptor sensitivity to xenobiotics as tested by different bioassays
F. Petit (Toulouse, France), P. Le Goff (Rennes, France), J.-P. Cravédi (Houston, TX, USA), O. Kah, Y. Valotaire and F. Pakdel (Rennes, France) 353
Relationship between expression of hepatic metallothionein and sublethal stress in channel catfish following acute exposure to copper sulphate
D. Schlenk (University, MS, USA), K.B. Davis (Memphis, TN, USA) and B.R. Griffin (Stuttgart, AR, USA) 367